

WHAT IS CLAIMED IS:

1. A computer accessible medium comprising instructions which, when executed:

- 5 (a) check a first storage from which a computer system is configured to boot for a block identified in a read request generated on the computer system, wherein the block is included within an image of a set of software resources to be provisioned on the computer system;
- 10 (b) if the block is stored in the first storage, supply the block from the first storage in response to the read request; and
- 15 (c) if the block is not stored in the first storage:
 fetch at least the block from an image repository system that stores the image;
 store the block in the first storage; and
 supply the block in response to the read request.

2. The computer accessible medium as recited in claim 1 wherein the read request is

- 20 generated in response to the computer system executing one or more of the set of software resources.

3. The computer accessible medium as recited in claim 1 wherein the instructions, when executed:

- 25 establish a virtual machine on the computer system;
 trap reads by the virtual machine to the image; and

for each read, perform (a), (b), and (c).

4. The computer accessible medium as recited in claim 3 wherein the instructions, when executed:

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trap writes by the virtual machine to the image; and

for each write, store the block or blocks in the first storage and track the blocks as modified with respect to the image on the image repository system.

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5. The computer accessible medium as recited in claim 3 wherein the instructions, when executed:

detect an initialization of a device driver for the first storage within the virtual
15 machine, the device driver coded to perform (a), (b), and (c) in response to read requests to the first storage; and

exit the virtual machine in response to detecting the initialization.

- 20 6. The computer accessible medium as recited in claim 3 further comprising second instructions which, when executed in response to a remote boot request from the computer system, transmit a program comprising the instructions to the computer system, the computer system booting using the program.
- 25 7. The computer accessible medium as recited in claim 1 wherein the instructions, when executed, maintain a map identifying which blocks of the image are stored in the first storage, and wherein checking the first storage for the block comprises checking the map.
8. The computer accessible medium as recited in claim 7 wherein the instructions, when

executed, are configured to update the map to indicate that the block is stored in the first storage in response to fetching the block from the image repository system and storing the block in the first storage.

- 5 9. The computer accessible medium as recited in claim 8 wherein the instructions, when executed in response to a write request, store a second block supplied in the write request in the first storage and update the map to indicate that the second block is stored in the first storage and is modified with respect to the image in the image repository system.
- 10 10. The computer accessible medium as recited in claim 9 wherein the instructions, when executed:

receive a request from the image repository system for modified blocks within the image;

- 15 identify modified blocks within the map; and

transmit the modified blocks to the image repository system.

- 20 11. The computer accessible medium as recited in claim 10 wherein the instructions, when executed:

receive an acknowledgement from the image repository system corresponding to the modified blocks; and

- 25 update the map to indicate that the modified blocks are not modified with respect to the image repository system.

12. The computer accessible medium as recited in claim 11 wherein the instructions,

when executed, track blocks in the map as modified or not modified separately for two or more computer systems including the image repository system.

13. The computer accessible medium as recited in claim 7 wherein the instructions
5 comprise a device driver, and wherein the computer accessible medium is further comprising a program comprising second instructions which, when executed:

receive one or more additional blocks from the image repository system, wherein
the one or more additional blocks are received independent of read
10 requests generated in the computer system and received by the device
driver;

store the one or more additional blocks in the first storage; and
15 update the map to indicate that the one or more additional blocks are stored in the
first storage.

14. The computer accessible medium as recited in claim 13 wherein the second
instructions, when executed, request the one or more additional blocks from the image
20 repository system independent of read requests generated in the computer system and
received by the device driver.

15. The computer accessible medium as recited in claim 14 wherein the second
instructions terminate execution in response to detecting that each block within the image
25 is stored in the first storage.

16. The computer accessible medium as recited in claim 1 wherein the first storage
comprises a local storage of the computer system.

17. A computer accessible medium comprising instructions which, when executed:

store a block identified in a write request generated within a computer system to a
first storage from which the computer system is configured to boot, the
5 block included in an image of a set of software resources that are
provisioned on the computer system; and

record that the block is modified with respect to the image stored in an image
repository system.

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18. The computer accessible medium as recited in claim 17 where the instruction that
record that the block is modified, when executed, update a map identifying blocks within
the image that are stored in the first storage to indicate that the block is stored in the first
storage and is modified with respect to the image stored in an image repository system.

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19. The computer accessible medium as recited in claim 17 wherein the instructions,
when executed, transmit the block to the image repository system.

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20. The computer accessible medium as recited in claim 19 wherein the instructions,
when executed:

receive an acknowledgement from the image repository system corresponding to
the block; and

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record that the block is not updated with respect to the image stored in the image
repository system responsive to the acknowledgement.

21. The computer accessible medium as recited in claim 20 wherein the instructions,
when executed, transmit a plurality of blocks recorded as modified, the plurality of blocks

including the block.

22. The computer accessible medium as recited in claim 21 wherein the instructions, when executed, transmit the plurality of blocks in response to receiving the request from the image repository system.
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23. The computer accessible medium as recited in claim 17 wherein the first storage comprises a local storage of the computer system.
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24. A method for provisioning a computer system with a set of software resources, the method comprising:
initiating execution of the set of software resources on the computer system prior to storing at least some blocks comprising the set of software resources to a first storage from which the computer system is configured to boot;
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the computer system generating a read request for a first block of the blocks comprising the set of software resources;
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if the first block is stored in the first storage, supplying the first block from the first storage; and
if the first block is not stored in the first storage:
fetching the first block from an image repository system that stores an image of the set of software resources;
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storing the first block in the first storage; and
supplying the first block in response to the read request.
25. The method as recited in claim 24 wherein initiating execution of the set of software

resources comprises responding to a remote boot request from the computer system with a plurality of instructions which, when executed, initiate the execution.

26. The method as recited in claim 24 further comprising:

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establishing a virtual machine on the computer system, the virtual machine initiating the execution of the set of software resources, the virtual machine generating the read request;

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trapping the read request by the virtual machine to the first storage.

27. The method as recited in claim 26 further comprising:

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trapping a write request by the virtual machine to the image; and

storing a block or blocks from the write request in the first storage and tracking the block or blocks as modified with respect to the image on the image repository system.

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28. The method as recited in claim 26 further comprising:

detecting that a device driver for the first storage within the set of software resources has been initialized; and

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terminating the virtual machine responsive to the detecting.

29. An apparatus comprising:

an image repository system configured to store an image of a set of software

resources; and

a computer system, wherein the computer system is configured to transmit a remote boot request in response to booting;

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wherein the image repository system is coupled to receive the remote boot request, and wherein the image repository system is configured to detect that the computer system is to be provisioned with the set of software resources, and wherein the image repository system is configured to respond to the remote boot request with a program which, when executed by the computer system, initiates execution of the set of software resources prior to at least some blocks in the image being copied to the computer system.

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15 30. The apparatus as recited in claim 29 wherein the computer system includes a first storage that is to store the image, and wherein the set of software resources includes a device driver for the first storage which, when executed in response to a read request generated responsive to executing the set of software resources, is configured to check the first storage for a first block identified by the read request, and wherein the device driver 20 is configured to supply the first block from the first storage if the first block is stored in the first storage.

25 31. The apparatus as recited in claim 30 wherein the device driver is configured to fetch the first block from the image repository system if the first block is not stored in the first storage, and wherein the device driver is configured to store the first block in the first storage, and wherein the device driver is configured to supply the first block in response to the read request.

32. The apparatus as recited in claim 30 wherein the program is configured to establish a

virtual machine to execute the set of software resources until the device driver is initialized, and wherein the virtual machine is terminated responsive to the device driver being initialized.

5 33. The apparatus as recited in claim 30 wherein the device driver, in response to a write request generate responsive to executing the set of software resources, is configured to store a second block identified by the write request in the first storage, and wherein the device driver is configured to track which blocks in the first storage are modified with respect to the image on the image repository system.

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34. The apparatus as recited in claim 33 wherein the image repository system is configured to generate a snapshot image of the set of software resources by requesting the modified blocks from the computer system, and wherein the computer system is configured to transmit the modified blocks to the image repository system in response to the request, and wherein the image repository system is configured to transmit an acknowledgement responsive to receiving the modified blocks, and wherein the computer system is configured to indicate that the blocks are not modified with respect to the image on the image repository system responsive to the acknowledgement.

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20 35. An apparatus comprising:

an image repository configured to store an image of a set of software resources;
and

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a computer system configured to execute the set of software resources, and
wherein the computer system is configured to track which blocks in a first storage from which the computer system is configured to boot and which correspond to the image are updated with respect to the image stored on the image repository, the updates generated by the computer system during

execution of the set of software resources; and

wherein a snapshot of the image as updated by the computer system is generated
by transmitting the modified blocks from the computer system to the
5 image repository system and not transmitting unmodified blocks.

36. The apparatus as recited in claim 35 wherein the image repository system is
configured to transmit an acknowledgement to the computer system in response to
receiving the modified blocks.

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37. The apparatus as recited in claim 36 wherein the computer system is configured to
indicate that the modified blocks are not modified responsive to the acknowledgement.

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38. The apparatus as recited in claim 35 wherein the first storage comprises a local
storage of the computer system.